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understanding of Nature in many of her varied aspects is an essential part of the intellectual equipment of the investigator. Moreover, mankind, collectively, through the agency of its men of science and inventors, is an investigator, slowly unraveling the complex of Nature and weaving from the disentangled thread the fabric of civilization. Its material, social and intellectual condition advances with the progress of its knowledge of natural laws and is wholly dependent thereon. As an investigator it makes each new conquest by the aid of possessions earlier acquired, and the breadth of its domain each day is the foundation and measure of its daily progress. Knowledge of Nature is an account at bank, where each dividend is added to the principal and the interest is ever compounded; and hence it is that human progress, founded on natural knowledge, advances with ever increasing speed.

G. K. GILBERT.

SOME FUNDAMENTALS OF NOMENCLATURE.

THE following paragraphs are a brief abstract of two consecutive papers read before the Biological Society, of Washington, on November 16 and 30, 1895. And, though averse to attempting the condensation of so much matter into small space, the attempt is made in deference to the expressed wishes of several who are interested in the questions discussed in the original papers.

It is certainly time that inquiry should be made into the remotest history of the evolution of the binary nomenclature in use by botanists and zoölogists; for it is only by the way of the history of any system that we may easily arrive at an understanding of its fundamental principles. Within the last thirty years there has been much legislation attempted respecting nomenclature. There is talk of further legislation in the future, and certainly much need of it, if by it we may

hope to establish a rational and acceptable system. Yet very few of those who enter the arena of nomenclatorial discussion seem disposed to acquire anything more than a superficial knowledge of the origin and development of the binary system; they have never looked carefully to see whether priority, or fitness in names, or the mere convenience of the biological public at a given period, or prevailing usage, is the fundamental principle which has brought the system to its present state; or whether the combined force of all these and some other possible principles have given us such a system—or such a set of systems—as we have, and are more or less content, or discontented.

No subject is well understood, now-days, it is everywhere conceded, until it has been viewed from the evolutionary standpoint. But research into the history and evolution of our nomenclature is still neglected; and some are, I think vainly, hoping to resolve all difficulties even by burying still more deeply in oblivion the early history of nomenclature. This is really a curious point in the present status of things. But the present need of historical research is clearly evinced by the absurdities which legislative bodies have already given expression to when endeavoring to state fundamentals.

In attempting to set forth what it calls 'Leading Principles' even the celebrated 'Paris Code' is more remarkable for cheap platitudes and skillful evasions than for any distinct pronouncements regarding principles. Botanists of that period were beginning to awaken to a sense of the importance of priority, but were not yet ready to accord it a place among what were designated as the Leading Principles, yet placing it first among accessory, or secondary, elements of nomenclature.

The body of American botanists who, in 1892, promulgated what is known as the

Rochester Code took a much more decided stand in favor of priority, placing that very word itself foremost in their code. "Priority of publication is to be regarded as the fundamental principle of botanical nomenclature." This language is, nevertheless, not quite so positive as at first reading it might seem. This legislative body apparently wished to say that the principle of priority *is* fundamental, yet did not feel warranted in saying exactly that, but said instead 'is to be regarded as fundamental.' Here at once a rather serious question is suggested. Unless priority be quite clearly fundamental, why should a body of scientific men agree to regard it as fundamental? In code-making, of whatever sort, everything stands or falls with the ground truth or truths on which the several articles or statutes rest. Error as to the ground principle invalidates every rule and regulation that may be built on it. Unless some one principle or set of principles may be declared quite positively fundamental, men waste their time in attempting to legislate; the rules are sure to be of little actual force. The authors of the Rochester Code, either consciously or unconsciously, were in a dilemma. They were obliged either to assert that priority is fundamental or else take for the ground principle of their code a mere hypothesis. They chose the hypothesis; and now, until they are ready to erase the hypothetic clause 'is to be regarded as,' each article which depends on the fundamentality of priority is equally hypothetical; that is to say, is no article at all, is utterly without force.

If priority were actually the fundamental principle of nomenclature it would be the chief criterion for the settling of the names of plants and animals; the oldest names would, as a rule, and without respect to other qualities, be maintained. This, however, is far from being the case, even under the working of the so-called Ro-

chester Code. In the case of *Quercus Prinos*, for example, we are employing what is absolutely the latest of the several names that have been given that tree; while the name *Q. castaneæfolia*, which not only enjoys absolute priority, but is also the most appropriate name of all ever given to the tree, is not to be found even in the recent synonymy of the species, and few are aware of its existence; and very numerous instances of this kind could easily be adduced. It may be added, by way of further illustration, that for three centuries the common watercress was known in botanical works by one or the other of the two following names, *Nasturtium aquaticum* or *Sisymbrium aquaticum*. But Linnæus, whom so many people suppose to have been the founder of the binary nomenclature, rejected both these good binary names, disregarded priority, and assigned the species a new and a ternary name, *Sisymbrium Nasturtium aquaticum*. Then again, in 1810, two British botanists sought to reinvest the plant with a binary name; one of these, Sir John Hill, restoring the title *Nasturtium aquaticum*, which had so many centuries of priority in its favor; the other, Robert Brown, giving it still another new designation, *i. e.*, *Nasturtium officinale*, and yet this last, the most recent of all specific names for the cress, is the one which has been sustained everywhere until very recently. Priority certainly is not fundamental when men do again and again in practice so completely ignore it as to seem governed by the very opposite principle, that of taking the newest names instead of the oldest.

The language of the second article of the Rochester Botanical Code is, in several ways, most unfortunate. Its phraseology runs thus: "The botanical nomenclature of both genera and species is to begin with the publication of the first edition of Linnæus' Species Plantarum, in 1753." I do not wish to discuss the absurdity of naming, as initial

for genera, a work in which no genus is defined by description, and in which few or none but the monotypical ones are defined even implicitly by the mention of type species; a book in which the generic names are, therefore, as a rule, *nomina nuda*. It is the unphilosophic handling of certain simple and universal principles, finding expression in logical absurdities, which most impresses the careful reader of the article above quoted. It is manifestly impossible that anything should be made to begin in time that is already past. Whatever affairs are to begin must begin either at once or in the future. Nothing 'is to begin,' or can be made to begin, last year or yesterday any more than in the year 1753. Doubtless the legislators at Rochester would have been glad had they dared to say that botanical nomenclature had its beginning in the year 1753. But they could not have said that. It would not have been true. They might, however, have offered an article which should have read somewhat after this fashion: "It is expedient that, in botanical nomenclature no priorities earlier than the year 1853 be recognized by us henceforward." I have little doubt that this is about what, from their point of view, they must have wished to say. But the situation, thus frankly expressed, would have been too manifestly an embarrassed one. Any number of persons might at once have asked: Why name as an initial date for genera and species a date which is not initial? Or, what expediency can there be in attempting to confine the action of the principle of priority—a principle whose sole force is retroactive—within such narrow limits? It would have been placing priority, previously agreed upon as at least hypothetically fundamental, under great restrictions such as utterly contradict the notion of its fundamentality. Priority is, above all other qualities in a name, the most absolute one, as absolute as the con-

dition of time itself. Its only criteria are dates. If priority be fundamental in nomenclature, then there can be no such thing as an initial date later than the very first beginnings of botanical writing, or publication of names. But, of course, there must be an initial date, a date back of which priorities are to be disregarded; but if this be true, priority is not fundamental, at least not more fundamental than some other principles; very possibly less so. But, having resolved, as our code-makers did, to treat it as being the one ground-principle of the scientific naming of things, they are in a dilemma from the moment of having passed a regulation limiting its action to within what is really a very recent date in the history of nomenclature. The second article of our code, in its real meaning, if it have any, is an almost emphatic contradiction of the first article. It is practically little less than a nullifying of that declaration about the fundamentality of priority, for it excludes, according to credits as given by most learned and eminent botanists of all eras, more than two thousand years of indubitable name priorities, and admits no names as having a history of quite a hundred and fifty years.

The proposition, in itself so perfectly and so evidently true, that priority is determined simply by historic dates—a circumstance which no legislation can alter—brings us back to our initial suggestion, that we can never be prepared to discuss thoroughly the important question of nomenclature, much less be ready to legislate upon this matter rationally and effectually, until we have studied, historically, the evolution of our system of naming plants and animals.

Such historical inquiry would, I think, bring us quickly to the point of acknowledging the principle of convenience—of mere utility—to be the one fundamental thing, which, not only lies at the bottom, but also has chiefly ruled the development

of such systems as we have. This, if found to be the fact, will be very far from yielding the least support to the people who just now, under the name of conservatism, are making the plea of convenience, as against us who would insist upon the exercise of the principle of priority; for they are only pleading as against present changes, that is, against a present and transitory inconvenience, as affecting only the present generation of biologists; whereas, the only convenience which reasonable principles can very seriously regard and try to provide for must be the general convenience of all, that of the future as well as of the present; nay, more than of the present; because it would be absurd to question that the future generations of those who will have to do with the names—scientific names—of plants and animals, are prospectively a thousand fold more numerous and important a body than the whole little handful of to-day, how large a handful we to ourselves may seem.

Of convenience, one of the very prime conditions, as far as relates to nomenclature, is brevity. Such of the Linnæan names of plants and animals as are binary have, by universal consent, been allowed to supersede those older names which were of from three to a dozen words' length; thus has more brevity abundantly proved itself a principle far more truly fundamental than priority.

Again, what is perhaps still more thoroughly an underlying principle of botanico-zoological nomenclature is that it be given in the terms of, and according to the rules of, an universal language. It were most easy to demonstrate that neither the binary quality of a name, nor a right of priority, nor both these qualities combined, ever gives a plant name the right to recognition, unless it have the quality of Latinity, unless it be given in the Latin language, at least as to its form. And this, too, is only a matter of

general utility; convenience is looked to, not indeed of the English, or of the Germans, or of the Russians, or of the Japanese; for the botanists of each and all these nations, separately considered, would be better accommodated, the English by the adoption of English instead of Latin, the Germans by the adoption of German, as the language of scientific nomenclature, and so on through the whole list of modern tongues.

Under a rational treatment of the whole subject it can hardly fail to appear that, as making for the convenience of the whole botanical world, in time present and to come, the first fundamental principle is that of an Universal Language of Nomenclature; the second, that of Brevity in Names; the third—and this subservient to both the aforementioned, and secondary to them—the principal of Priority of Publication.

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IMPRESSIONS OF THE NAPLES ZOÖLOGICAL STATION.

THE *Stazione Zoologica* of Naples is so well known that it is quite unnecessary to say anything at present about the history of this famous establishment. The editor of SCIENCE has asked me, however, to write an account of the work of the station as seen from within during my visit of ten months to Naples. During that time it was my good fortune to occupy the table of the Smithsonian Institution, and I take this opportunity to express to the Secretary of the Smithsonian and to the Associated Board of Directors of the Naples Table my indebtedness for the appointment.

Prof. Dohrn has recently given in *Nature* an account of the history of the Naples station and of the work that has been accomplished. Prof. Dohrn's life and interests have been so intimately connected with